

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Polynomial Operations Written Exam (version 1)

**NO CALCULATORS. NO NOTES. Multiplication table OK.**

**1. Let polynomials  $p(x)$  and  $q(x)$  be defined below.**

$$p(x) = -8x^5 + 3x^4 - x^3 + 2x^2 + 9$$

$$q(x) = 5x^5 - 10x^4 + 3x^2 - 8x + 1$$

**Express the difference  $q(x) - p(x)$  in standard form.**

**2. Let polynomials  $a(x)$  and  $b(x)$  be defined below.**

$$a(x) = 4x^2 + 5x - 8$$

$$b(x) = 3x - 2$$

**Express the product  $a(x) \cdot b(x)$  in standard form.**

**3. Express  $(x + 1)^4$  in standard (expanded) form.**

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4. Let polynomials  $f(x)$  and  $g(x)$  be defined below.

$$\begin{aligned}f(x) &= 4x^3 - 21x^2 + 9x - 11 \\g(x) &= x - 5\end{aligned}$$

The quotient of  $\frac{f(x)}{g(x)}$  can be expressed as a polynomial,  $h(x)$ , and a remainder,  $R$  (a real number).

$$\frac{f(x)}{g(x)} = h(x) + \frac{R}{x - 5}$$

By using synthetic division or long division, express  $h(x)$  in standard form, and find the remainder  $R$ .

5. Let polynomial  $f(x)$  still be defined as  $f(x) = 4x^3 - 21x^2 + 9x - 11$ . Evaluate  $f(5)$ .